Appendix B – Design Features & Criteria and Forest Plan Direction

This appendix includes a list of codes and explanations used in Appendix A in the "Management Requirements Design Features" column. These management requirements are comprised of Forest Plan Standards and Guidelines as well as site- specific mitigations.

D= Site Specific Feature
G= Forest Plan Guideline
S= Forest Plan Standard

Descriptions of Design Features for the Fourmile Vegetation Management Project.

Code	Design Features
D1	Riparian areas would be protected by applying standards set in the Wisconsin's Forestry Best Management Practices for Water Quality Field Manual: 1) No operation of tracked or wheeled vehicles within 15 feet of the high water mark of lakes, designated trout streams and streams 3 feet wide or wider operate wheeled or tracked equipment within 15 to 50 ft. of Ordinary High Water Mark (OHWM) only when ground is frozen or dry. 2) Do not harvest fine woody material within 50 ft of the OHWM. 3) Distances for these measures should be expanded in the case of steep slopes.
D2	Activities which could disturb little goblin moonwort (*Botrychium mormo*) plants, their habitat, or microhabitat should not occur within 250 feet of little goblin moonwort populations. The extent of little goblin moonwort populations will be determined by a Botanist, Biologist, Ecologist, or other qualified observers (technicians or contractors) designated by a Botanist, Biologist, or Ecologist.
D3	In stands with known occurrences of little goblin moonwort (*Botrychium mormo*) site disturbing activities should only occur during frozen ground conditions.
D4	Activities which could disturb bluntlobe grapefern (*Botrychium oneidense*) plants, their habitat, or microhabitat should not occur within 250 feet of bluntlobe grapefern populations. The extent of bluntlobe grapefern populations will be determined by a Botanist, Biologist, Ecologist, or other qualified observers (technicians or contractors) designated by a Botanist, Biologist, or Ecologist.
D5	In stands with known occurrences of bluntlobe grapefern (*Botrychium oneidense*) site disturbing activities should only occur during frozen ground conditions.
D6	Activities which could disturb American ginseng (*Panax quinquefolius*) plants, their habitat, or microhabitat should not occur within 100 feet of American ginseng populations in stands proposed for selection harvest with canopy gaps or within 250 feet of American ginseng populations in stands proposed for selection harvest in the Argonne Experimental Forest. The extent of American ginseng populations will be determined by a Botanist, Biologist, Ecologist, or other qualified observers (technicians or contractors) designated by a Botanist, Biologist, or Ecologist.

D7	In stands with known occurrences of American ginseng (*Panax quinquefolius*) site disturbing activities should only occur during frozen ground conditions.
D8	Activities which could disturb known garlic mustard (*Alliaria petiolata*) infestations should only occur during frozen ground conditions. These areas are to be avoided.
D9	Any newly discovered RFSS plants located in treatment areas will be buffered and avoided during project implementation.
D10	Insure, to the extent practicable, that road fill and gravel sources do not contain NNIS. If NNIS free fill and gravel sources are not available, scrape the top layer off of the fill/gravel source and use the fill/gravel underneath.
D11	Known non-native invasive plant infestations will be avoided during implementation. Exceptions may be made on a case by case basis and will be evaluated by the District Botanist/Ecologist. Unknown non-native invasive plant infestations should be reported to the District Botanist, Biologist, or Ecologist as they are discovered.
D12	Hauling during the snowmobile season on the snowmobile trail would require signing, coordination with snowmobile clubs and restricted hauling from 12:00 (noon) Friday through 12:00 midnight Sunday each weekend and on holidays.
D13	Timber harvest and hauling to occur between October 20th and March 15th. Sale preparation, i.e. marking, shall be completed to minimize obtrusiveness and to minimize duration of visible marking prior to harvest.
D14	Winter only logging operations
D15	Winter or dry summer-fall
D16	High SIO
D17	Moderate SIO
D18	Minimize human disturbance 330 feet beyond the designated 30-acre buffer area from February 15 to August 1. (Goshawk and Red-shouldered).
D19	Within the clearcut units, individual trees and/or clumps of tree would be retained for structure, future den trees, and future course woody debris. Coordinate with the wildlife biologist.
D20	Stand includes 300 meter buffer (no mechanical activities from April 1 through October 1) to protect wood turtle nesting habitat. See wildlife biology for specific location.
D21	Include 30-acre buffer for active Goshawk or red-shouldered hawk nests. See wildlife biologist for specific location.
Water Resources (pages 2-1 to 2-3)	
Watershed Protection and Management	
S1	Maintain minimum in-stream flows at 25% of base flows or that flow determined from a site specific analysis using commonly accepted in-stream flow methods.
G1	Maintain water quality by following guidelines contained in “Wisconsin’s Forestry Best Management Practices for Water Quality,” (BMPs), 2010 edition (or subsequent revisions) Manage riparian areas so that they contribute large woody debris (LWD) to lakes, ponds, rivers, and streams. LWD characteristics include: (1) At least 10 to 30 pieces

	per 1,000 feet of shoreline adjacent to uplands, and at least 5 to 20 pieces per 1,000 feet of shoreline adjacent to forested lowlands; (2) Most pieces greater than 12 inches in diameter and some resistant to decay; (3) Many pieces in lakes with strong branches on the boles which hold part of the wood off the bottom; (4) LWD length should be at least 50 to 120 feet long in lakes and wide streams, or a length that is 1 to 2 times bankfull width in narrow-medium width streams (i.e. less than 50 ft wide).
G2	Utilize the "Wisconsin Construction Site Best Management Practices Handbook" as well as the "Best Management Practices for Erosion and Sedimentation Control," (Federal Highway Administration) for guidance on limiting sedimentation.
G3	Ensure revegetation of log landings after project activities are completed, either through artificial means or natural revegetation.
G4	Utilize Wisconsin's Forestry BMPs to maintain soil productivity, infiltration rates and minimize road maintenance costs.
Riparian Areas	
S2	Design and maintain roads and trails in riparian areas or other locations that could affect water quality, in accordance with Wisconsin's Forestry Best Management Practices. Road and trail surfaces within these areas will be stabilized with aggregate or other suitable material when being used during non-frozen conditions.
G6	Do not pile slash within or move slash into riparian areas. Keep slash out of lakes, stream channels, floodplains, and areas where it may be swept into streams, rivers, and lakes.
G7	Utilize Wisconsin's Forestry Best Management Practices (BMPs) for riparian management zone categories. Expand riparian management zones wider than those defined in Wisconsin's Forestry BMPs and modify management practices where necessary (e.g., projects on steep slopes and/or highly erodible soils).
G8	Protect warm and cold-water streams from sedimentation by maintaining the physical integrity of intermittent and non-navigable streams, i.e., streams that do not appear on 1:24,000 topographic maps to ensure their continued function when they do contain water.
G9	Avoid stream and wetland crossings and riparian areas when constructing new roads and trails.
Wetlands	
G10	Utilize guidelines found in Wisconsin's Forestry BMPs to maintain water quality and hydrologic wetland functions during activities such as timber harvesting or road and trail construction.
G11	Minimize fill and maintain cross road drainage when wetland road and trail crossings cannot be avoided.
Soils (page 2-3)	
Soils	
G12	Use R9 directive for Chapter 2 of Forest Service Handbook 2509.18 to define detrimental disturbance threshold values for soil displacement, erosion, rutting, nutrient loss, compaction, burning, and maintaining ground cover.

G13	Minimize topsoil displacement into piles or windrows when machine piling slash and debris.
G14	Designate the location of roads, trails, landings, main skid trails, and similar soil disturbing activities. Stabilize disturbed sites during use and revegetate after use to control erosion.
G15	Operate heavy equipment only when soils are not saturated or when the ground is frozen. (Follow the Recommended Operating Season column in Appendix A to apply this guideline by stand and soil type, e.g. Winter Only, Winter or dry summer/fall etc.)
G16	In clearcuts, retain logging slash in place (limbing at the stump) where topsoil is less than one inch thick, or where organic matter is less than 2%. (IN Soils ApendixA_Fourmile_20180515)
Biological Resources (pages 2-3 to 2-4)	
Biological Diversity	
G17	Promote and maintain long-lived conifer super canopy trees, especially white pine.
G18	Maintain stand level ecosystem components, patterns, and pit and mound microtopography.
G19	Design management activities adjacent to research natural areas, special management areas, and old growth areas to complement their ecological values.
G20	Manage vegetation within utility right of way corridors, where permitted, to support landscape level ecological goals including wildlife populations and habitat.
Vegetation Management (pages 2-4 to 2-5)	
Temporary Openings	
G21	Temporary openings will not exceed 40 acres in size except: Within Management Areas 4C and in compartment and stand: 2189-14, 2211-5, 2218-20, 2218-30, 2218-31, 2218-35, 2218-41, and 2219-13. .
G22	Within areas other than those listed above, separate two or more openings with a total area exceeding 40 acres by manageable stands at least 10 acres in size with an average width of at least 500 feet.
Rotation Lengths	
G23	Table 2-1 (page 2-4) lists the minimum, standard, and extended rotation lengths for various forest types. Rotation age will be determined by the capability of a site. As a general rule the standard rotation ages will be used except in Management Areas 2B, 3B, 4B and 6B where the extended rotation ages will be used. The minimum rotation age guidelines may be waived for stands that have been significantly affected by fire, windthrow, insect or disease attack or other similar natural disturbance forces. Some stands may also be harvested before minimum or after extended rotation ages when site capability, and or site specific analysis indicates it would be best for meeting overall multiple use objectives.
Silvicultural Maintenance and Conversion of Forest Cover Types (pages 2-5 to 2-13)	
Aspen	

G24	Harvest aspen during the dormant season where the aspen species is desired and aspen totals less than 40 square feet of basal area in the stand.
G25	Site preparation for natural aspen regeneration should reduce the site's average residual crown cover (2" in diameter or larger) to less than 5% (excluding reserve islands) within all Management Areas except 1B, 2A, and 2B. The average residual crown cover for site preparation for aspen regeneration with Management Areas 1B, 2A, and 2B (in instances where aspen is to be maintained) is allowed to approach 10% (excluding reserve islands).
G26	Do not apply treatments that support an increase in beaver populations adjacent to northern white-cedar stands.
Paper Birch	
G27	Notify the Great Lakes Indian Fish and Wildlife Commission (GLIFWC) about potential bark gathering opportunities when identifying paper birch for harvest.
Northern Hardwoods	
G28	Do not harvest yellow birch within the northern hardwood ecosystem unless its density must be lowered to facilitate recommended residual basal area, its regeneration is facilitated with canopy gaps, nurse logs, and/or planting, and sufficient seed source remains to take advantage of regeneration opportunities.
G29	Maintain shade on and around large boulders, 10 feet in diameter and larger, by not establishing canopy gaps near them.
Uneven-aged Management of Northern Hardwoods	
G30	Initial cuts in pole-sized hardwood stands should combine a crop tree release of 50-60 crop trees per acre with the creation of regeneration canopy gaps. Trees removed are generally high risk, have poor stem quality, and/or provide growing space for better quality residual trees.
G31	Between canopy gaps, thin to the minimum stocking levels shown in Figures FF-1, FF-2 or FF-3 in Appendix FF, when converting from even-age northern hardwoods to uneven-aged northern hardwood management. These figures are based on maintaining at least an 80% crown closure. Exception to this guideline: Initial thinnings in northern hardwood stands result in a crown closure of 75-80%. Tree crowns in these stands close in within a few years.
G32	Create four to eight 25 to 40-foot wide canopy gaps per acre by harvesting groups of pole-sized trees or 1-2 large-crowned trees. The percentage of area in canopy gaps is a function of the harvest interval (longer harvest intervals should have a higher percentage of canopy gaps as a general rule). Create a maximum of one, 60-foot canopy gap for every two acres, where maintenance of mid-tolerant species composition is desired (the 60-foot gap replaces some of the 25 to 40-foot gaps). The addition of the larger gap will reduce the number of smaller gaps to 3-6 per acre.
G33	Cut poor-quality stems larger than one inch in diameter in canopy gaps so vigorous regeneration can develop.
G34	After the initial improvement or selection harvest, periodically apply selection harvests that work toward the size class distribution shown in Tables 2-4 or 2-5. Create canopy gaps by harvesting large enough groups of trees to obtain successful regeneration in younger stands where crown sizes are small to moderate in size.

G35	Reserve hemlock in northern hardwood prescriptions. The following are exceptions to this guideline: (1) Hemlock trees may be cut if they impede road or skid trail development, and (or) safety problems are improved; and (2) On the Medford land base, (LTAs 212Xd05 and 212Xe05) thinning of hemlock clumps within northern hardwood stands (greater than 10% hemlock) is allowed when there is established hemlock regeneration, or hemlock regeneration efforts are planned within or adjacent to these clumps. Where hemlock regeneration is established, it will be protected and encouraged through site-specific protection measures.
G36	Maintain an 80% crown closure in order to avoid light level changes that result in soil temperature increases, and humidity and soil moisture decreases. See initial thinning crop tree release guidance for exceptions to this guideline.
Red Oak Group (northern red oak and pin oak)	
G37	Limit harvesting or pruning in the red oak group to the period between October 1 and April 15 to reduce risk of oak wilt infections.
G38	Obtain a residual basal area between 70 and 90 square feet in intermediate harvests. Harvesting should improve spacing, favor the development of quality crop trees, and maintain within stand diversity.
Red Pine	
G39	Conduct the first commercial thinning when operable red pine stand volumes are available. Thereafter, red pine thinnings should occur every 7-15 years. Do not remove more than 40% of the basal area (except the first thinning). Thin to the following residual basal areas: (see table 2-9 on page 2-10)
Jack Pine	
G40	Regenerate jack pine by clearcut harvesting followed by natural or artificial reforestation. Consider the genetic quality of existing jack pine stands when deciding whether to use natural or artificial reforestation methods.
Balsam Fir	
G41	When balsam fir is the objective, and where it has developed advanced understory regeneration, remove the overstory when the understory is in the seedling/sapling stage.
White Pine	
G42	Utilize an even-aged silvicultural prescription for managing white pine.
G43	Begin intermediate thinnings as soon as operable volumes are available. Thin at 10-15 year intervals to a residual basal area between 100 and 150 square feet per acre (70%-90% crown closure).
G44	Use a two-cut shelterwood system (seed cut and removal cut) to regenerate white pine stands at rotation age. The seed cut should retain a residual crown cover of 40-70%. Use the lower level when competition from low shade is not expected. Conduct site preparation immediately prior to or after the seed cut to: (1) scarify 35-50% of the area (mixing humus and mineral soil); and (2) remove undesirable and unmerchantable trees. Removal harvest should occur when regeneration is about 20-25 feet tall.

G45	When establishing white pine: Retain a crown closure of about 40% in underplanted white pine stands until the overstory is removed.
G46	When establishing white pine: Remove overstory when saplings are 20-25 feet tall.
G47	When establishing white pine: Underplant white pine at a minimum of 100 seedlings per acre (20-foot spacing) for species diversity and at a minimum of 435 per acre (10-foot spacing) for stand replacement.
G48	Accomplish blister rust pathological pruning when trees are in the seedling/sapling stage (3-10 feet tall).
White Spruce	
G49	Begin thinnings as soon as operable volumes are available. Thin at 10-20 year intervals to a residual basal area of between 100 and 120 square feet per acre. Do not remove more than 40% of the basal area in any single harvest.
Wildlife and Fish (pages 2-14 to 2-18)	
Timber Harvest Reserve Areas and Reserve Trees*	
G50	Leave and protect existing downed logs greater than 10 inches in diameter (small end diameter) consistent with providing for management access (e.g. skid trails).
G51	Exclude heavy logging equipment from wet areas, excessively steep slopes, or reserved areas within timber harvest units.
Reserve tree guidelines for even-aged managed stands	
G52	Emphasize diversity, cover and (or) mast by reserving tree species such as hemlock, northern white cedar, white pine, red oak, American beech, hickory, ironwood, blue beech, yellow birch, paper birch and other species that may not have strong local or forest wide representation.
G53	Reserve the above-listed tree species in small clumps or islands of trees within clearcuts, overstory removal cuts, and other regeneration harvest areas.
G54	Reserve 2 to 5 live trees per acre greater than 11 inches in diameter, or select the largest trees available; and reserve variable size reserve islands/clumps that total up to ½ acre for every 10 acres managed with an even aged harvest.
Reserve snag guidelines for even-aged and uneven-aged managed stands	
G55	Reserve all dead snags and live den trees up to 10 trees/snags per acre, unless they present a safety concern. Emphasize the largest snags and den trees available. Those snags felled for safety reasons should be left on site as coarse woody debris wherever possible. Additional snags will be recruited from live reserve trees.
Wetlands Management	
Guidelines	
G56	Avoid fragmenting shallow water marshes, or large wetlands containing open water, with corridors used for power lines, roads, and trails.
G57	Protect hydrologic functions and maintain hydrologic regimes.

Woodland Ponds - Ephemeral and Permanent	
Ephemeral ponds smaller than one acre:	
G58	Ephemeral ponds smaller than one acre: Do not operate heavy equipment in woodland ponds.
G59	Ephemeral ponds smaller than one acre: Locate landings and roads to avoid erosion and the contribution of sediment into woodland ponds.
G60	Ephemeral ponds smaller than one acre: Do not allow logging slash in woodland ponds. However, selected trees may be dropped and left in ponds where large woody debris would enhance aquatic habitat.
G61	Ephemeral ponds smaller than one acre: Prohibit the operation of heavy equipment during non-frozen conditions within 15 feet of the normal high water mark.
Ephemeral ponds larger than one acre:	
G62	Ephemeral ponds larger than one acre: Do not operate heavy equipment in woodland ponds.
G63	Ephemeral ponds larger than one acre: Locate landings and roads to avoid erosion and the contribution of sediment into woodland ponds.
G64	Ephemeral ponds larger than one acre: Do not allow logging slash in woodland ponds. However, selected trees may be dropped and left in ponds where large woody debris would enhance aquatic habitat.
G65	Ephemeral ponds larger than one acre: Prohibit the operation of heavy equipment during non-frozen conditions within 15 feet of the normal high water mark.
G66	Ephemeral ponds larger than one acre: Do not clearcut within 50 feet of the normal high water mark of these ponds. Individual tree timber harvesting may be done within this zone if there is an emphasis on retaining shade trees and large diameter cavity and nest trees adjacent to the pond.
Permanent woodland ponds smaller than one acre:	
G67	Permanent woodland ponds smaller than one acre: Do not operate heavy equipment in woodland ponds.
G68	Permanent woodland ponds smaller than one acre: Locate landings and roads to avoid erosion and the contribution of sediment into woodland ponds.
G69	Permanent woodland ponds smaller than one acre: Do not allow logging slash in woodland ponds. However, selected trees may be dropped and left in ponds where large woody debris would enhance aquatic habitat.
G70	Permanent woodland ponds smaller than one acre: Prohibit the operation of heavy equipment during non-frozen conditions within 15 feet of the normal high water mark.
G71	Permanent woodland ponds smaller than one acre: Do not clearcut within 50 feet of the normal high water mark of these where they are uncommon (less than one per 10 acres). Where they are common, do not clearcut within 50 feet of at least one-third of the ponds. Individual tree timber harvesting can be done within this zone if there is an emphasis on retaining shade trees and large diameter cavity and nest trees adjacent to the pond.
Permanent woodland ponds larger than one acre:	

G72	Permanent woodland ponds larger than one acre: Use “Wisconsin’s Forestry Best Management Practices for Water Quality” (2010 or subsequent revisions) including Riparian Management Zone direction, for guidance on protection.
Upland Wildlife Habitat Management	
G73	Provide for an average of one ruffed grouse drumming log for every 10 acres of aspen clearcut. The log should be 10 inches or more in diameter and at least 12 feet long.
Fisheries Habitat Management	
S3	Maintain a minimum of 80% shrub or tree shade (where present) around ground water seeps within cool and cold water systems.
G74	Manage riparian areas so that they contribute large woody debris (LWD) to lakes, ponds, rivers, and streams. LWD characteristics include: (1) At least 10 to 30 pieces per 1,000 feet of shoreline adjacent to uplands, and at least 5 to 20 pieces per 1,000 feet of shoreline adjacent to forested lowlands; (2) Most pieces greater than 12 inches in diameter and some resistant to decay; (3) Many pieces in lakes with strong branches on the boles which hold part of the wood off the bottom; (4) LWD length should be at least 50 to 120 feet long in lakes and wide streams, or a length that is 1 to 2 times bankfull width in narrow-medium width streams (i.e. less than 50 ft wide).
Aspen and Beaver Management	
S4	Aspen patches will not be regenerated within 450 feet of selected Class I, II, and segments of Class III trout streams including their tributaries and spring ponds (see App. DD). Aspen patches will also not be regenerated within 300 feet of all other Class I and II trout streams including their tributaries and spring ponds. Manage vegetation within these zones for species other than aspen, preferably long-lived conifers and northern hardwoods.
Federal Threatened and Endangered Species (pages 2-18 to 2-19)	
Bald Eagle	
S5	Retain restrictions as described in the “Northern States Bald Eagle Recovery Plan” (1983) within 330 feet of the former nest tree site (when a nest disappears, but the tree remains, or other suitable nesting structures are nearby), as long as the bald eagle breeding area is occupied. If the nest tree blows down, and no suitable replacement trees are nearby, all restrictions can be removed.
S6	Remove restrictions in the area beyond 330 feet when a nest is classified as a remnant (i.e., a nest unmaintained and unoccupied for five consecutive years).
G75	Close or relocate roads and trails (under Forest Service jurisdiction) within 1,320 feet of a nest site to vehicular traffic between February 15 and August 1. Waive this requirement only if no feasible alternatives exist and use can be justified.
G76	Reserve known roosting, perching, and potential nest trees within active bald eagle breeding areas.
Regional Forester's Sensitive Species (RFSS) (pages 2-19 to 2-24)	

Regional Forester's Sensitive Species (RFSS)	
Note: Some of these species may be found in more than one habitat. In addition, the RFSS list is subject to change and can be found on the web page for the Eastern Region.	
S7	Do not allow the collection of RFSS plants, except for scientific or educational purposes, or for the conservation or propagation of the species. Collection must be authorized by a Forest Service permit.
G78	Vegetation management within 100 to 500 feet of RFSS plant and animal sites will be limited to practices that maintain or enhance habitat and micro-habitat conditions. Animal sites are defined as active nest, active den, or evidence of breeding activity.
G79	Prohibit domestic livestock grazing, and restrict recreation activities as needed within the 100 to 500 foot distance from an RFSS site.
West Virginia White Butterfly	
D22	Harvesting may not occur between March 15 and July 15th in northern hardwoods to protect the West Virginia white butterflies.
American Marten	
G80	Within areas determined to be occupied by marten (see Glossary for definition of American Marten occupied areas) do the following: Leave 15-25% of potential timber salvage unharvested following large disturbance events (greater than 100 acres) except in salvage situations determined high risk to human safety and/or forest health.
G81	Within areas determined to be occupied by marten (see Glossary for definition of American Marten occupied areas) do the following: Incorporate Management Area 2B Reserve Tree Guidelines (Chapter 3) relative to tree numbers and diameters to even and uneven-age managed stands, where existing tree diameters allow.
RFSS Plant Species Found in Upland Hardwood Habitats	
G82	Protect dense bryophyte mats (moss, liverworts, and hornworts) in areas considered highly suitable for *Asplenium trichomanes*
Spruce Grouse	
D23	Emphasize a mosaic of jack pine / spruce habitat in an array of age classes from regenerating to mature, including lowland spruce patches in areas of historic and known spruce grouse populations. Management activities will help provide an extensive and continual supply of dense stands of short-needled conifers with live branches 0 to 13 feet above the ground.
Wood Turtle	
D24	Protect known communal wood turtle nesting sites from predator impacts, where feasible, and protect from site disturbance due to construction, or recreation use impacts.

D25	Streambank stabilization projects must protect wood turtle nesting sites. Utilize the following mitigation measures: (1) Reshape the bank and smooth contours when revegetating exposed streambanks; (2) Partially cover stabilization structures with sod and revegetate with species similar to those growing on the adjacent bank; (3) Vary the rock size and utilize native rock for rip rap and within-water rock structures; and (4) Maintain natural lake edges and stream meanders when making shoreline and within stream improvements.
Forest Health and Disturbance Processes (pages 2-25 to 2-26)	
Forest Health	
G83	Manage short-lived pioneer species at rotations that minimize susceptibility to catastrophic events such as large fires and insect outbreaks. Exceptions are made for areas specifically managed or influenced by natural disturbances.
Fire Management	
G84	Consider a range of fuel treatment options that include but are not limited to: commercial timber sales, other utilization methods, mechanical treatment, fuel break construction, and prescribed fire.
G85	Introduce diversity into the prescribed burning regime by lengthening burn intervals, allowing fuels and topography to determine intensity, and varying the seasons when prescribed burning is applied.
G86	Focus fuels reduction activities within the urban interface and the areas surrounding the communities at risk.
Non-Native Invasive Species	
G87	Avoid the placement of log landings in areas infested with non-native invasive plant species.
G88	Consider non-native invasive plant species treatment when planning prescribed burn projects in areas of heavy weed infestation.
G89	Minimize the need for prescribed burn area fire lines and soil disturbance by using existing barriers where possible.
G90	Utilize staging areas and helispot facilities (for prescribed burning) that are free of non-native invasive plant species.
Heritage Resources (page 2-29)	
Heritage Resources	
G91	*Complete heritage resource surveys and document any required protective mitigation measures prior to project implementation. Decision documents must display required mitigation measures and evidence of compliance with applicable laws and regulations*
G92	In the event that human remains are encountered during implementation activities, all work must immediately cease in the area of the discovery. Forest archaeological staff must be notified of the discovery within 24 hours. All discoveries will be treated in accordance with NAGPRA (Public Law 101-601; 25 U.S.C. 3001-3013), and work shall not resume in this area without authorization from the Forest Heritage Program Manager.

G93	In the event that previously unreported cultural resources are encountered during implementation activities, all work must immediately cease within 30 meters (100 feet) and Forest archaeological staff shall be notified. The find must be appropriately documented and work may resume only with approval of the Forest Heritage Program Manager.
Reforestation	
Guidelines for High and Moderate SIO Areas:	
G94	Planting within high and moderate SIO areas should be done in a non-linear pattern, within 100 feet of a travel corridor, use area, or water feature.
Tree marking	
G95	Apply tree-marking paint on the sides of trees that face away from travelways, use areas, and water bodies.
Treatment of Residue from Timber Harvest or other vegetation removal activities	
G96	Establish a 10-foot slash removal zone adjacent to travelways, use areas, and water bodies within high SIO areas, and where vegetation management activities have occurred adjacent to private land.
Temporary Openings	
G97	Borrow from natural or man-made openings in the surrounding landscape, and follow natural boundaries to minimize straight-line opening edges.
G98	Establish reserve areas when there is a visual need to reduce the apparent size of a temporary opening.
Transportation Systems (pages 2-35 to 2-38)	
Road Design, Construction and Reconstruction	
Guidelines for State and County Highways, Forest Service scenic byways, and travel routes to campgrounds and other major recreation use areas that are listed and mapped as High SIO roads in the Forest SIO maps included in map packet:	
G99	Provide consistent construction lines, a smooth finish, and a neat appearance for the final shaping and grading of roadbeds, shoulders, and ditch slopes.
G100	Allow back slopes to be rough, partially covered with scattered woody debris, and, if possible, to re-vegetate naturally.
G101	Plant native or desirable non-native species immediately after construction or reconstruction, where natural re-vegetation is unlikely, or sedimentation and erosion are concerns.
G102	Use accepted guidelines (AASHTO) to establish travelway width.
G103	Allow an average of no more than two side road entrances per mile on each side of a High SIO road.
G104	Reduce clearing limits and maintain tree crown closure over roads (as much as possible).
G105	Consider adjusting the clearing limits or road alignment to reserve trees with outstanding scenic qualities.
G106	Highlight outstanding roadside visual features with turnouts and vistas.

G107	Bury slash and grade to contour, remove it from view, or lop it down to 24 inches in the visible area up to 100 feet from the roadside. Bury or place uprooted stumps out of view from the road.
G108	Incorporate aesthetic modifications into the design of bridges, guardrails, major culverts, outlet ditches, and other drainage control devices.
G109	Brush roadsides on a 5-year cycle.
G110	Use wood or manmade materials with natural appearing colors on signs and posts.
G111	Use High SIO road guidelines for Forest Service road construction and reconstruction and when the Forest has the opportunity to provide road design or maintenance advice to other jurisdictions that have the authority and responsibility to maintain or improve High SIO roads that cross national forest land (e.g., state and county highways).
Guidelines for Maintenance Level 4 and 5 roads that are listed and mapped as moderate SIO Roads in the Forest SIO inventory.	
G112	Apply High SIO road guidelines with the following change: Moderate SIO roads, compared to High SIO roads, may have a rougher appearance and less consistent construction lines. Also, the final shaping and grading of Moderate SIO roadbeds, shoulders, and ditch slopes need not have as neat an appearance as High SIO roads.
Guidelines for All Maintenance Level 5 roads not included in the High or Moderate SIO category and roads that border designated Wilderness and Wilderness study areas.	
G113	Minimize clearing widths by utilizing cut, fill, and back slope grades that are the steepest permissible for safety, soil conditions, and the height of the cut.
G114	Final shaping and grading of shoulders and ditch slopes may be rough in appearance. Back slopes may also be rough in appearance and covered with loose woody debris.
Road Decommissioning and Landscape Restoration	
G115	Decommission classified and unclassified roads that are closed to motorized traffic and identified as not needed for long-term access.
G116	Road decommissioning must render a road inaccessible to all motorized traffic, including all-terrain vehicles. Effectively preventing motorized vehicles from gaining access to any portion of a decommissioned road may involve obstructing access at several points along the road.
G117	Render a road inaccessible by reclaiming the first 300 feet (or the distance necessary to prevent viewing the road from an intersecting or adjacent travelway). This action may involve restoration of the natural topography, scarification of the roadbed (deep disking), utilizing erosion control measures, planting trees, and (or) placing natural obstructions (boulders, downed trees, etc.) in the road in such a way that they appear visually haphazard but effectively restrict access. Use a combination of closure devices, including but not limited to berms, boulders, and downed trees, when rendering a road inaccessible.

G118	Roads identified for decommissioning and made inaccessible may receive one of the following levels of landscape restoration: Minimum Level Restoration: Render roads inaccessible, remove stream crossings, and rehabilitate streambeds and banks. This level of restoration is typically applied to Maintenance Level 3, 2, and 1 dead end roads that have only minimally altered the landscape. The roadbed and clearing have few improvements and natural re-vegetation is likely to occur (little or no additional planting or seeding).
G119	Roads identified for decommissioning and made inaccessible may receive one of the following levels of landscape restoration: Moderate Level Restoration: Render roads inaccessible, remove stream crossings, and rehabilitate streambeds and banks. Remove road improvements that contribute to resource degradation and mitigate road improvements that alter the landscape. Moderate level road restoration measures include (but are not limited to) removing road surfacing (if salvageable), establishing erosion control measures on steep grades and cut and fill slopes, removing fill from wetland crossings, removing cross-drainage structures, and assisting re-vegetation where necessary.
G120	Roads identified for decommissioning and made inaccessible may receive one of the following levels of landscape restoration: Maximum Level Restoration: Render roads inaccessible, and, as much as possible; completely remove all road improvements from the landscape (signs, gates, culverts, etc.). Restore natural topography, wetlands, and watercourses along the length of the road. Scarify (deep disc) the compacted area and reforest or re-vegetate the entire travelway. Maximum Level Restoration is typically applied to remnant portions of Maintenance Level 5, 4, or 3 roads that have been relocated to repair resource damage, where complete removal and restoration of the roadbed is necessary, or where restoration of the natural landscape is a primary goal (Wilderness study areas, SPNM areas, etc.).
G121	Road decommissioning and restoration priorities: Resource protection and (or) restoration.
G122	Road decommissioning and restoration priorities: Abandoned roadbeds and unneeded access roads associated with road relocation.
G123	Road decommissioning and restoration priorities: Meeting desired road densities within Research Natural Areas, Special Management Areas, and Old Growth and Natural Feature Complexes.
G124	Road decommissioning and restoration priorities: Local roads that connect to arterial or collector roads scheduled for reconstruction.
G125	Road decommissioning and restoration priorities: Working towards desired total road density within areas not listed above and shown as 2.0 mile/square mile open road density on Road Density Map.
G126	Render inaccessible and restore skid trails that access local or collector roads and remain open to public traffic (skid trails drivable by high clearance four-wheel drive vehicles). This process may be delayed if roads and skid trails need to be utilized for post sale rehabilitation treatments.
S8	Decommission all temporary roads upon completion of authorized use. (IN Soils ApendixA_Fourmile_20180515)
Road and Landing Locations, and Access and Skidding Requirements	

G127	Access logging operations from local or collector roads wherever possible.
G128	When the only logging operations access alternative is from a gravel or paved road, the access road should have a gravel surface for the first 100 feet, unless it is used during frozen ground conditions.
G129	Locate landings a minimum of 100 feet from a collector road. Landings should not be located within the road template of an arterial or town road (including the ditch line and back slope). Landing location exceptions can be obtained with written permission from the township.
G130	Skidding should not occur on arterial or town roads.
G131	Roads should provide access to within a specified skidding distance for timber harvesting operations (road access that provides skidding distances of no more than one-quarter mile in most situations). Some terrain and soil types may allow skidding distances of as much as one-half mile. Consult current research information on economic harvesting and skidding techniques before determining a maximum skid distance in a given terrain and soil type.
Roads Management and Related Soils and Vegetation Impacts	
G132	Minimize road impacts by utilizing soil protection measures described in “Wisconsin’s Forestry Best Management Practices,” March, 2010 edition (or subsequent revisions)
G133	Stabilize road cut and fill slopes using the most effective, natural-appearing, and cost-efficient methods available.
G134	Consider seasonal road use restrictions (with effective closures) for roads that traverse silt-cap soils. Utilize road design modifications that are environmentally sound and minimize erosive rutting on poorly drained soils.
G135	Control erosion and effectively manage water flow on and adjacent to roads by providing adequate roadside and outlet ditches, ditch checks, and cross-drainage.
G136	Plant native or desirable non-native plant species where vegetative cover is needed to stabilize slopes or decommission a travelway.
G137	Insure, to the extent practicable, that road fill and gravel sources do not contain non-native invasive plant species.
G138	Avoid stream and wetland crossings, riparian areas, and frost pockets (whenever possible) when constructing or relocating roads.
Guidelines for Management Areas 2A, 2B, and 2C	
Biological Diversity	
MA 2A and 2B:	
G139	Retain long-lived conifers and hardwoods as reserve trees within aspen clearcuts. Where long-lived trees are not present—retain short-lived conifers if they are available.
G140	Maintain white pine and hemlock within 300 feet of rivers with a bankfull width of 50 feet or larger.
MA 2A, 2B, and 2C:	

G141	Manage riparian corridor forest types (especially within 300 feet of rivers with a bankfull width of 50 feet or larger) primarily under uneven-aged management systems and at maximum rotations.
Reserve Tree Guideline for Uneven-Aged Managed Stands:	
MAs 2A and 2C:	
G142	Reserve 3 to 7 live trees per acre larger than 11 inches. Focus on the largest trees available.
MA 2A, 2B, and 2C:	
G143	Emphasize the retention of long-lived conifers such as hemlock and white pine (as a component of the reserve live tree numbers). In addition, reserve other tree species that are not well represented in the stand or on the Forests (yellow birch, paper birch, red oak, white oak, American beech, etc.).
Guidelines for Management Areas 4A, 4B, and 4C	
Biological Diversity	
Reserve Tree Guidelines for Uneven-Aged Managed Stands:	
MAs 4A and 4C:	
G144	Reserve 3 to 7 live trees per acre larger than 11 inches. Focus on the largest trees available.
MAs 4A, 4B, and 4C:	
G145	Emphasize the retention of long-lived conifers such as hemlock and white pine (as a component of the reserve live tree numbers). In addition, reserve other tree species that are not well represented in the stand or on the Forests (yellow birch, paper birch, red oak, white oak, American beech, etc.).
Fire Management	
MAs 4A, 4B, and 4C:	
G146	Emphasize prescribed fire for fuels reduction treatments. Where feasible, combine fuels reduction treatments with ecological restoration activities using prescribed fire.